DESCRIPTION

INFORMATION PROCESSING APPARATUS, INFORMATION PROCESSING

METHOD, PROGRAM, AND STORAGE MEDIUM

Technical Field

     The present invention relates to an information

processing apparatus and an information processing method

for processing data stored illustratively on a storage

medium. The invention further relates to a program to be

executed by the information processing apparatus and to a

storage medium on which the program is written.

Background Art

     It is common practice today to browse websites and

to send and receive e-mails over networks including the

Internet using information processing apparatuses such as

personal computers.

     To access the network using the personal computer

or like equipment generally involves the user's manual

input of information items necessary for setting up an

environment suitable for connecting to the network or for

carrying out application programs connected to the net-

work. The input is typically made through an input guid-

1

ance program called a wizard.

Following the input of such information to the personal computer, an operating environment appropriate for connecting to the network or for executing application programs is set up accordingly and the settings are retained in the PC. Thereafter, the setting information is used to access the network or to perform application programs correctly.

The above set-up of the environment involves a considerable number of input items and calls for a certain knowledge of networks. That means the set-up work is never easy for the general user.

The environment setting information, as mentioned above, is retained in the personal computer where the information was input and set up. If the user wants to use a different personal computer, the user is required to make the relatively complicated manual data input all over again for setting up the environment on the new personal computer.

At present, when using a Web browser or utilizing an application program for e-mail transmission and reception, each user is thus required to set up an operating environment necessary for accessing the network and carrying out the application program on each personal com-

puter.

That means the degree of flexibility is low for
each user to readily access the network using a different
personal computer that needs to be set up to create the
same operating environment.

One solution to the above bottleneck is disclosed
illustratively in Japanese Patent Laid-open No. Hei 9-
198156. The disclosure is outlined as follows:

An application program is assumed to be installed
beforehand in chargeable public-use computers. A user is
offered a storage medium that contains operating environ-
ment data for executing the application program and a
storage area for accommodating work data (i.e., applica-
tion files). When the user utilizes any one of the pub-
lic-use computers, the user-owned storage medium is
loaded into the computer and the operating environment
data is read from the medium into the computer to set up
the operating environment for the application program.
When execution of the application program is brought to
an end, the work files derived from the program execution
are written from the public-use computer to the user's
storage medium.

Where the structure above is provided, the user
need only carry around the above-described storage medium

3

necessary for using the public-use computer. There is no
need for the user to make environment setting input to a
plurality of different computers, which makes public com-
puter use appreciably easier than before.

The structure disclosed in the above-cited Japanese
Patent Laid-open No. Hei 9-198156 requires installing the
application program into public-use computers beforehand.
That means the user can only use the public-use computer
that retains the application program for which the envi-
ronment can be set up using the user-owned storage medium.
In that sense, the disclosed structure still poses limi-
tations on the degree of flexibility for the user to em-
ploy different personal computers in the same operating
environment.

Disclosure of Invention

The present invention has been made in view of the
above circumstances. According to one embodiment of the
invention, there is provided an information processing
apparatus including: storage medium drive controlling
means for controlling writing and reading of data to and
from a storage medium including at least a first storage
area which stores data constituting an application pro-
gram in a nonrewritable format, a second storage area

4

which stores identification information indicating that
at least the application program is legitimately stored
on the storage medium, and a third storage area into
which to store user-related information in write-once
fashion; authenticating means for authenticating the
storage medium at least in accordance with the identifi-
cation information stored in the second storage area;
setting means which, if the storage medium is success-
fully authenticated by the authenticating means, then
sets requirements for executing the application program
stored in the first storage area, using setting informa-
tion which at least includes the user-related information
and which is stored on the storage medium; and executing
means for executing, in an environment set up by the set-
ting means, the application program stored in the first
storage area of the storage medium.

According to another embodiment of the present in-
vention, there is provided an information processing
method including the steps of: writing/reading data to
and from a storage medium including at least a first
storage area which stores data constituting an applica-
tion program in a nonrewritable format, a second storage
area which stores identification information indicating
that at least the application program is legitimately

5

stored on the storage medium, and a third storage area
into which to store user-related information in write-
once fashion; authenticating the storage medium at least
in accordance with the identification information stored
in the second storage area; if the storage medium is suc-
cessfully authenticated in the authenticating step, then
setting requirements for executing the application pro-
gram stored in the first storage area, using setting in-
formation which at least includes the user-related infor-
mation and which is stored on the storage medium; and
executing, in an environment set up in the setting step,
the application program stored in the first storage area
of the storage medium.

According to a further embodiment of the present
invention, there is provided a program for causing an in-
formation processing apparatus to carry out a procedure
including the steps of: writing/reading data to and from
a storage medium including at least a first storage area
which stores data constituting an application program in
a nonrewritable format, a second storage area which
stores identification information indicating that at
least the application program is legitimately stored on
the storage medium, and a third storage area into which
to store user-related information in write-once fashion;

6

authenticating the storage medium at least in accordance
with the identification information stored in the second
storage area; if the storage medium is successfully au-
thenticated in the authenticating step, then setting re-
quirements for executing the application program stored
in the first storage area, using setting information
which at least includes the user-related information and
which is stored on the storage medium; and executing, in
an environment set up in the setting step, the applica-
tion program stored in the first storage area of the
storage medium.

   According to an even further embodiment of the pre-
sent invention, there is provided a storage medium which
stores the above-outlined program.

   Where the information processing apparatus, infor-
mation processing method, and program according to the
invention are in use, predetermined information which at
least includes user-related information and which is
stored on a storage medium is used in a process to make
the settings necessary for executing an application pro-
gram stored on the same storage medium. The setting proc-
ess establishes an operating environment in which to exe-
cute the application program held on the storage medium.

   That is, the set-up of the environment for using

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the application program stored on the storage medium is

carried out automatically using environment setting in-

formation stored on the same storage medium.

The set-up of the environment and the execution of

the application program will not be allowed unless the

storage medium is authenticated by use of identification

information that is stored on the same storage medium in

nonrewritable fashion. In other words, an illegitimate

storage medium on which the identification information is

not found does not allow the operating environment to be

set up or the application program to be carried out.

Brief Description of Drawings

Fig. 1 is a schematic view showing typical storage

areas allocated on a piece of application media embodying

the present invention;

Figs. 2A, 2B and 2C are explanatory views showing

how a piece of application media embodying the invention

is used in conjunction with a personal computer in opera-

tion;

Figs. 3A, 3B, 3C and 3D are explanatory views show-

ing how a piece of application media embodying the inven-

tion is used in conjunction with personal computers in

operation;

Fig. 4 is a block diagram showing a typical internal structure of a personal computer;

Fig. 5 is a flowchart of steps in which a personal computer complying with the inventive application media typically operates; and

Fig. 6 is another flowchart of steps in which the personal computer complying with the inventive application media typically operates.

Best Mode for Carrying out the Invention

Fig. 1 schematically shows how data content is written to a piece of application media embodying the present invention. This piece of application media contains a predetermined application program and is owned by a user who utilizes an information processing apparatus such as a personal computer.

It is assumed here that the piece of application media 2 embodying this invention is an optical disk type storage medium.

As illustrated, the piece of application media 2 has in its radially innermost zone a media ID area A1 in which a media ID is recorded.

The application media 2 embodying this invention are manufactured illustratively as package media which

9

store an application program and which are marketed to
the general public. The media ID is assigned uniquely to
each piece of application media 2 thus manufactured for
identification purposes. In other words, the media ID
identifies each piece of application media 2 legitimately
manufactured.

    With this embodiment, the media ID is written to
the media ID area A1 as follows: writable optical disk
media such as CD-ROM, CD-R and CD-RW are each required to
provide an area in which to record disk type identifica-
tion information (i.e., the area is called the disk type
identification information area) radially inside of a TOC
area. The disk type represents illustratively the ROM
type, write-once type, rewritable type, etc.

    When a disk drive that complies with CD-ROM, CD-R
and CD-RW is loaded with a disk, the drive first accesses
the disk type identification information area to deter-
mine the disk type. With the type of the loaded disk rec-
ognized, the disk drive establishes a corresponding op-
eration mode.

    The disk type identification information is re-
corded to a protective film layer over a signal recording
layer on the signal side of the disk. The disk type iden-
tification information recorded in the protective film

layer is ROM type information that remains nonrewritable.

With this embodiment, the media ID is recorded to the media ID area A1 using the same technique as that of recording the disk type identification information to the protective film layer. That is, the media ID is recorded to the media ID area A1 in the protective film layer in nonrewritable fashion, the area A1 being located radially inside of the TOC area.

During manufacture, a writable area is typically set aside in the protective film layer to form a media ID area A1 large enough to accommodate the size of data stipulated as a media ID. A serial number is recorded as a unique media ID to that writable area allocated in the protective film layer of each piece of media. The data size of the media ID may be illustratively 64 bytes, considering a sufficient number of media IDs to cover all pieces of manufactured package media and the density of the data to be recorded to the protective film layer with the current state of the art.

Radially outside of the media ID area A1, five areas are typically formed: a TOC area A2, a first ROM area A3, a second ROM area A4, an R area A5, and an RW area A6, arranged in that order from the radially innermost zone of the disk toward its circumference. It should be noted

11

that data is recorded to the five areas in the signal re-
cording layer under the protective film layer.

TOC information about this disk is recorded to the
TOC area A2 in nonrewritable fashion (i.e., in ROM for-
mat) during manufacture.

The TOC area A2 may also accommodate information
such as file system information used by the personal com-
puter to manage writing and reading of data to and from
the application media.

The data constituting a given application program
is written to the first ROM area A3 in nonrewritable
fashion during manufacture. Whereas any application pro-
gram may be recorded in this area, this embodiment pre-
supposes the storage in this area of a so-called mailer,
a program for sending, receiving and managing e-mail data
over networks such as the Internet.

Preset information is written to the second ROM
area A4 in nonrewritable fashion during manufacture. The
information is recorded with the following circumstances
take into account:

As is generally known, to use networks such as the
Internet requires setting up an environment for accessing
the network and for sending and receiving e-mails, using
information including the address of an ISP (Internet

12

Service Provider) and the IP address of a DNS (Domain Name System) server, the addresses of mail transmission and reception servers, and the user's mail address.

Where the ISP, mail transmission and reception servers, and settings of other necessary arrangements are determined in advance for using the mailer stored on the application media 2, the above-mentioned address of the ISP, IP address of the DNS server, and addresses of the mail transmission and reception servers may be determined beforehand regardless of the user.

Of the settings necessary for establishing the suitable environment, those that have been predetermined as described above are then written to the second ROM area A4 as the preset information in the case of this embodiment.

The R area A5 is a write-once recordable area. User setting information may be written to this area in nonrewritable fashion.

The user setting information refers illustratively to user-specific environment setting information such as the user's mail address as part of the environment setting information necessary for setting up the environment. During manufacture, the R area A5 is produced as a blank area with no data recorded therein.

13

The RW area A6 is a recordable-rewritable area. This area accommodates application files that can be processed by the application program held in the first ROM area A3. Since the RW area A6 is a rewritable area, it is possible to add new applications files to this area or to update or delete existing application files in or from this area.

The RW area A6 is also produced as a blank area with no data recorded therein during manufacture.

The TOC area A2 (ROM area), first ROM area A3, and second ROM area A4 may be arranged to constitute an emboss pit zone in the signal recording layer. Data may be recorded to these areas illustratively by a stamping process.

The R area A5 may be arranged to constitute a dye film-based signal recording layer for use with CD-R, DVD-R. Compatible disk drives are designed to record data to the R area A5 in the signal recording layer.

The RW area A6 may be arranged to constitute a signal recording layer that can be addressed illustratively by the phase change recording method for use with CD-RW, DVD-RW and +RW. The disk drive need only be structured to record data to this type of signal recording layer.

As described, the inventive piece of application

14

media is a so-called hybrid disk on which diverse storage
areas including the ROM areas, write-once read-only area
(R area), and readable-writable area (RW area) are allo-
cated side by side for diverse kinds of data to be re-
corded therein.

During manufacture, as explained above, a media ID
is recorded to the media ID area A1 which is a ROM area
in the protective film layer. Radially outside of the me-
dia ID area A1, TOC information is written to the TOC
area A2, an application program to the first ROM area A3,
and preset information to the second ROM area A4. The R
area A5 and RW area A6 are left blank with no data re-
corded therein.

The inventive piece of application media 2 thus
manufactured retains the application program in ROM for-
mat and offers recordable areas in a virgin state when
marketed as package media to the general public.

Described below with reference to Figs. 2A through
3D is how the piece of application media 2 embodying this
invention is typically used by the user. Also outlined is
how the personal computer operates in conjunction with
the piece of application media 2 embodying the invention.

The description and outlining will proceed in keep-
ing with the numbered steps parenthetic in the figures.

15

The piece of application media 2 manufactured as
discussed above according to the invention is marketed as
packet media to the general public typically in shops, as
indicated by step (1) in Fig. 2A. At the marketing stage,
the data recorded on the application media 2 is made up
mostly of a media ID, an application program, and preset
information. At this stage, user setting information and
application files are not recorded on the media yet.

As discussed above, TOC information is also re-
corded as ROM data during manufacture. In the description
that follows, however, it is assumed that the TOC infor-
mation has already been recorded on the media for purpose
of simplification and illustration. The TOC information
will be mentioned only if doing so is specifically needed.

The application media 2 may alternatively be mar-
keted through diverse distribution channels, including
mail order.

Any user who may want to make use of the applica-
tion program (e.g., mailer) stored on the application me-
dia 2 as package media is expected to purchase and own,
in step (2), a piece of application media 2 being mar-
keted.

The user in possession of the piece of application
media 2 loads it into the personal computer, in step (3)

16

shown in Fig. 2B.

With this embodiment, the user typically loads an as-purchased piece of application media 2, i.e., a disk with no user information recoded on it, into the personal computer. In turn, a display device of the personal computer is prompted to display a GUI screen through which to input the user setting information (i.e., the screen is called the user setting information input screen). In step (4), the user enters necessary items of the user setting information into input boxes of the user setting information input screen typically in alphanumeric characters by operating a keyboard or the like.

For this embodiment, it was assumed above that the mailer is stored on the application media 2 as the application program. As described, to use the mailer requires establishing beforehand the settings necessary for accessing a network such as the Internet as well as the environment settings for operating the mailer.

For this embodiment, it is also assumed for purpose of simplification and illustration that the information necessary for the set-up of the environment is constituted solely by the address of an ISP server, the IP address of a DNS server, the address of a mail transmission server, the address of a main reception server, and the

17

user's mail address. Where the ISP has already been determined, the address of the ISP server, IP address of the DNS server, address of the mail transmission server, and address of the reception server may be determined in advance regardless of the user.

Of the environment setting information necessary for establishing the suitable environment, the IP address of the ISP server, IP address of the DNS server, address of the mail transmission server, and address of the mail reception server are thus assumed to be written to the second ROM area A4 of the application media 2 at the marketing stage (or manufacturing stage) in the case of this embodiment.

It follows that, with this embodiment, the only user setting information to be written to the R area A5 of the application media 2 is the user's mail address which is just one item of the environment setting information. That is, the item to be entered in step (4) is the user's mail address alone.

According to the invention, as described, the environment setting information common to users is written beforehand to the application media 2 as preset information. This arrangement minimizes the number of items to be input manually by each user as part of the environment

18

setting information in step (4). Illustratively, only the user's mail address needs to be entered in step (4) with this embodiment.

When the user has finished inputting the mail address to the user's personal computer in step (4), the personal computer records the input mail address to the R area A5 of the loaded application media 2 as the user setting information. It should be noted that the R area A5 is a write-once area where data may be added but not changed and that no further data can be added to the area once a closing process is executed on that area. When the necessary user setting information has been written to the R area A5, that area is "closed." Thereafter, the R area A5 serves as a ROM area that retains the user setting information in a nonrewritable manner.

As a result, the inventive piece of application media 2 holds at this point the user-input user setting information in addition to the media ID, application program, and preset information stored earlier during manufacture, as shown in Fig. 2C. With the user setting information recorded, all environment setting information necessary for using the mailer (i.e., application program) is stored in nonrewritable ROM format on the application media 2.

19

The mail address (i.e., user setting information) as part of the environment setting information is unique to the user who purchased and owns this piece of application media 2. That means the piece of application media 2 on which the mail address is stored can be used solely by the user in question.

In the description that follows, two kinds of application media 2 may be distinguished from each other: application media 2 with a complete set of environment setting information stored thereon, including preset information and user setting information; and application media 2 in an as-manufactured state with the setting information yet to be recorded thereon.

What is depicted in Figs. 3A through 3D will now be explained. In Fig. 3A, the user is shown in possession of a piece of application media 2 with user setting information stored thereon as indicated in Fig. 2C. Suppose that the user wants to run the application program (i.e., mailer) stored on the setting information-furnished piece of application media 2 on a personal computer PC1 indicated in Fig. 3B. In that case, the user loads this piece of application media 2 into the personal computer PC1 in step (1) as indicated.

The personal computer PC1 then recognizes the user

20

setting information on the loaded piece of media, and de-
termines that what has been loaded is a setting informa-
tion-furnished piece of application media 2.

With the loaded piece of application media 2 found
to carry the setting information, the personal computer
PC1 proceeds to execute an authenticating process by
which to determine whether the loaded piece of applica-
tion media 2 is a legitimate one, in step (2) of Fig. 3B.

As will be discussed later in more detail, a check
is made here to determine whether a media ID is recorded
in the media ID area A1 in the protective film layer of
the application media 2.

If the media ID is not detected where it should be,
that means the currently loaded piece of application me-
dia 2 furnished with the setting information is not a le-
gitimately marketed piece of application media 2. The
loaded piece of media may well have been produced by il-
licitly copying the application program on a recordable
medium in the same disk format as the legitimate applica-
tion media 2.

When the media ID is not found, the authenticating
process is unsuccessful and any subsequent processes will
not be carried out on the application media 2. In this
manner, the loaded piece of media is authenticated only

if it is found to contain a media ID which is supposed to be recorded on every piece of legitimate application media 2.

Once the media ID is recognized on the loaded piece of media in the authenticating process, the piece of media in question is authenticated as a valid piece of application media 2.

Following the successful authentication, the personal computer PC1 sets up a user-specific environment necessary for the user to access the network and to send and receive e-mails in step (3) of Fig. 3B as indicated. The set-up of the environment, performed illustratively by the operating system (OS) of the personal computer PC1, involves making use of the preset information in the second ROM area A4 and the user setting information in the R area A5 on the loaded piece of application media 2 furnished with the setting information.

When the set-up of the environment is completed, the application program (mailer) is started following its retrieval from the first ROM area A3 of the loaded piece of application media 2 furnished with the setting information, in step (4) of Fig. 3B. Once started, the mailer carries out processes corresponding to the user's operations on the personal computer PC1 in the environment set

up in step (3) above for connecting to the network and for executing the application program.

For example, if the user performs operations to send or receive e-mail, connection is established with the ISP and with the mail transmission and reception serves over a network 10 in accordance with the network connection environment that has been set up.

If the user performs operations to terminate the application program, the mailer that has been active is brought to an end. With this embodiment, the following process also takes place when the mailer is terminated:

Since the mailer was started in step (4) above and has been in operation, new application files represented by received or transmitted mails may have been created. Such application files are retained in a RAM or on a hard disk drive of the personal computer PC1 while the mailer is active.

As will be discussed later, one advantage derived from the use of the inventive application media 2 is that as long as a legitimate piece of application media 2 is purchased and owned by a user, it can be loaded into different personal computers to let the user utilize the application program (mailer) easily without manually inputting the settings into each new PC to set up a user-

23

specific operating environment therein.

If the application files of the mailer were held during operation illustratively in the RAM of the personal computer PC1, they would disappear when the personal computer PC 1 is turned off and can never be used again by the user. If the application files were retained on the hard disk drive, they would not be erased when the personal computer PC1 is deactivated but cannot be used by the user when he or she runs the mailer on another personal computer.

Such inconveniences are bypassed by this embodiment when, upon termination of the mailer, the application files being retained by the personal computer PC1 are written to the RW area A6 of the loaded piece of application media 2 for storage in step (5) of Fig. 3B.

When the piece of application media 2 is unloaded from the personal computer PC1 upon termination of the mailer in step (6) as indicated, the piece of media is furnished with the application files of the mailer in addition to the setting information already stored on the media as shown in Fig. 3D.

As a result, the user in possession of the setting information-furnished piece of application media 2 may carry around the application files derived from execution

24

of the mailer together with that application program.

Suppose now that the setting information-furnished piece of application media 2 shown in Fig. 2A is loaded into a personal computer PC2 of Fig. 3C which is differ-ent from the personal computer PC1 of Fig. 3B, in step (7) as indicated.

In that case, the personal computer PC2 carries out steps (8), (9), (10) and (11) in the same manner as steps (2), (3), (4) and (5) explained earlier with reference to Fig. 3B. Upon termination of the mailer, the loaded piece of application media 2 is ejected (i.e., unloaded) from the personal computer PC2 in step (12) as indicated. This allows the inventive piece of application media 2 to re-tain not only the setting information but also the appli-cation files derived from the mailer execution shown in Fig. 3D.

It should be noted that the setting information-furnished piece of application media 2 which contains the application files as shown in Fig. 3D can also be loaded into and used by yet another personal computer different from the PC on which the files were created. For example, the setting information-furnished piece of application media 2 to which the application files have been written by the personal computer PC1 in Fig. 3B may be loaded

25

into and used by the personal computer PC2.

In the foregoing case, when the mailer is started, the application files are read from the loaded piece of application media 2 so that the user may operate on the files while using the mailer. When the user performs operations to create, update or delete application files, the result of the operations on the files will be reflected in the RW area A6 (i.e., the files are updated) upon termination of the mailer.

From the description above, it can be seen that this embodiment of the invention offers the following features:

With this embodiment, user setting information is written to a piece of application media 2 devoid of setting information so as to create a piece of application media 2 with the setting information stored thereon. Once created, the setting information-furnished piece of application media 2 need only be loaded into any personal computer whereby the user-specific operating environment is automatically set up and the mailer is started. In other words, as long as the user intends to use the application program stored on this particular piece of application media 2, there is no further need for the user to repeat the tedious and complicated manual input of

settings to each new personal computer to set up the nec-
essary environment therein as has been the case conven-
tionally.

The absence of the need to input settings anew also
applies to the case where the mailer stored on the appli-
cation media 2 is to be used on a personal computer dif-
ferent from the one usually utilized by the user as il-
lustrated in Figs. 3A through 3D. This gives the user a
greater degree of freedom than before because the use of
the application program is not limited to any specific
personal computer.

As another example, if the user replaces the exist-
ing personal computer with a newly purchased PC, there is
no need for the user to make entries into the PC to set
up the operating environment anew for the application
program as long as the inventive piece of application me-
dia 2 is utilized.

Furthermore, the environment setting information
common to different users is stored beforehand in ROM
format on the inventive application media 2 as preset in-
formation. This makes it possible to minimize the number
of items of user setting information to be input for cre-
ating the setting information-furnished piece of applica-
tion media 2. Illustratively, only user-specific items

27

that need to be entered personally by the user are re-quired to be input. That means the one-shot work of inputting the user setting information is made as simple and straightforward as possible.

The personal computer PC shown in Fig. 2A through 2C may be either of the personal computers PC1 and PC2 indicated in Figs. 3A through 3D. Alternatively, the personal computers PC, PC1 and PC2 may all be different computers.

In other words, the personal computer operated by the user to write the user setting information to the piece of application media 2 devoid of the setting information may or may not be the same as the personal computer into which the user loads the setting information-furnished piece of application media 2 to set up the necessary environment therein for executing the mailer application. It does not matter whether the same or different computers are used on these two occasions.

What follows is a description of how the personal computer for performing operations compatible with the inventive piece of application media 2 discussed above is illustratively structured.

Fig. 4 is a block diagram showing a typical structure of a personal computer conforming to the application

28

media 2 embodying the invention. The personal computer 1 shown in Fig. 4 corresponds illustratively to any one of the personal computers PC, PC1 and PC2 indicated in Figs. 2A through 3D.

The personal computer 1 has a network interface 110 for conducting communications over the network 10. The network interface 110 enables the personal computer 1 to access an information processing apparatus such as another personal computer connected to the network 10.

In practice, the network interface 110 should preferably be structured in compliance with the communication protocol of a LAN if the personal computer is connected to the LAN, or in accordance with TCP/IP if the PC is connected to the Internet.

A CPU 101 carries out diverse processes in keeping with the operating program (OS) and various application programs installed illustratively on a hard disk drive 108 or in accordance with programs held in a ROM 102. With this embodiment, processes are also performed by executing the application program (mailer) stored on the piece of application media 2 loaded in a media drive 107, to be described later.

A RAM 103 is a work area for use by the CPU 101. As such, the RAM 103 accommodates programs and data

needed by the CPU 101 in carrying out its diverse proc-
esses.

An input/output interface 104 is connected illus-
tratively to input devices such as a keyboard 105 and a
mouse 106. Operation signals supplied from these input
devices are output through this interface to the CPU 101.

The input/output interface 104 is also connected to
the media drive 107. The media drive 107 is structured as
a disk drive capable of writing and reading data to and
from the loaded disk at least in the format of the appli-
cation media 2 embodying the invention.

The input/output interface 104 is further connected
to the hard disk drive 108 equipped with hard disks as
its storage medium. The CPU 101 may write and read data
and programs to and from the hard disk drive 108 by way
of the input/output interface 104. Also connected to the
input/output interface 104 is a display monitor 109 for
displaying pictures.

An internal bus 111 is constituted illustratively
by a PCI (Peripheral Component Interconnect) bus or by a
local bus or the like. It interconnects the component de-
vices inside the personal computer.

Described below with reference to the flowcharts of
Figs. 5 and 6 are typical processes performed by the per-

sonal computer 1 with regard to the loaded piece of ap-

plication media 2. The steps shown in the figures are

carried out by the CPU 101 in accordance with the operat-

ing system and with the application program (mailer)

started by the OS from the loaded piece of application

media 2.

In step S101, the personal computer 1 waits for a

piece of media to be loaded into the media drive 107.

When the media drive 107 is found loaded with the piece

of media, step S102 is reached.

In step S102, the media ID area A1 on the loaded

piece of media is accessed and signals are read from that

area in which a media ID is supposed to be recorded. In

step S103, a check is made to determine whether any media

ID is read from the accessed media ID area A1.

If the media ID is read from the accessed area,

that means the loaded piece of application media 2 is a

legitimate one because of the media ID found in the media

ID area A1. In this case, step S104 and subsequent steps

are reached and carried out.

If the media ID is not read from the access area of

the loaded piece of media, that means there is no media

ID recorded in what is supposed to be the media ID area

A1. The loaded piece of media is then deemed to be some-

thing other than the application media 2 according to this invention. In this case, step S110 is reached and a predetermined process is carried out on the loaded piece of media.

What is deemed something other than the application media 2 illustratively includes an illegitimate copy of application media 2 produced by copying the application program data to a compatible piece of media. Since the illicitly copied piece of application media 2 has no media ID that should have been recorded during manufacture, the result of the check in step S103 is negative, and control is passed on to step S110.

When step S110 is reached and carried out, that means step S104 and subsequent steps will not be performed on what has turned out to be an illicit copy of application media 2. That is, an attempt to load and use an illegitimate copy of application media 2 is rejected by the personal computer 1 that remains inoperable with respect to the loaded media. This arrangement forestalls the use of illicit copies of the application media 2.

In other words, step S103 serves as an authenticating process whereby the loaded piece of application media 2 is checked for validity based on the putative presence of a media ID thereon.

32

When the result of the check in step S103 is af-
firmative, step S104 is reached and the R area A5 on the
loaded piece of application media 2 is accessed. In step
S105, a check is made to determine whether user setting
information is absent from the R area A5 of media, i.e.,
whether the loaded piece of application media 2 is one
which is devoid of user setting information.

If the result of the check in step S105 is affirma-
tive (i.e., if the loaded piece of application media 2 is
found free of the setting information), then steps S106
through S109 are reached and carried out to let the user
input the user setting information that is recorded to
the media.

It is assumed that the first ROM area A3 of the ap-
plication media 2 embodying the invention contains not
only the application program constituting the mailer but
also a user setting information registration program
known as a wizard. When step S106 is reached, the user
setting information registration program is called up
from the first ROM area A3.

Under control of the operating system (OS), the CPU
101 causes the media drive 107 to read the user setting
information registration program from the first ROM area
A3. The program thus read out is loaded into the RAM 103

33

and started.

When the user setting information registration pro-
gram is thus started, a GUI screen appears on the display
monitor 109 prompting the user to input the user setting
information. In turn, the user operates the input device
such as the keyboard 105 and/or the mouse 106 to make
necessary entries into the GUI screen as prompted. Step
S107 is a process in which the user enters the user set-
ting information and the entries are processed accord-
ingly.

With this embodiment, the user setting information
consists of the user's mail address only. Thus in step
S107, the user inputs his or her mail address and the in-
put is processed correspondingly.

Following the input of the user setting information
in step S107, a check is made in step S108 to determine
whether the user has performed an operation to finalize
the input. If the finalizing operation is found to have
been carried out, step S109 is reached.

The user setting information (i.e., character data
constituting the user's mail address) entered in step
S107 is being held in the RAM 103. In step S109, instruc-
tions are given to transfer the user setting information
from the RAM 103 to the media drive 107 and to write the

34

user setting information from the media drive 107 to the

R area A5 of the application media 2. Accordingly, the

media drive 107 writes the transferred user setting in-

formation to the R area A5 of the application media 2 for

storage. After the user setting information is recorded

on the media, a finalizing operation is performed on the

R area A5 so that data will not be added inadvertently to

that area thereafter.

If the check in step S105 reveals that the loaded

piece of application media 2 is already furnished with

user setting information, then the steps shown in Fig. 6

are reached and carried out so that the necessary prepa-

rations will be made for making use of the application

program recorded on the media.

In step S120 of Fig. 6, the personal computer sets

up the environment necessary for utilizing the applica-

tion program (mailer) held on the loaded piece of appli-

cation media 2.

More specifically, the media drive 107 is in-

structed to read the preset information and the user set-

ting information from the second ROM area A4 and the R

area A5 on the application media 2 in such a manner that

the retrieved information will be retained in the RAM 103.

As mentioned above, the preset information and user set-

35

ting information provides all necessary information for setting up the operating environment. In other words, the environment setting information is made up of the preset information and user setting information.

On the basis of the acquired environment setting information (i.e., preset information and user setting information), another environment is set up to allow for access to the network and for the transmission and reception of e-mails. That is, an environment setting file needed to set up the environment for network connection and for mail transmission and reception is created in such a manner as to reflect the content of the acquired environment setting information. The system of the personal computer is further arranged to enable the content of the environment setting file thus prepared.

In step S121, a process is carried out to start the application program (mailer). More specifically, the media drive 107 is instructed to read the mailer from the first ROM area A3 and load the retrieved application program into the RAM 103.

If any application files are found recorded in the RW area A6, these files are also retrieved and placed into the RAM 103 for temporary storage.

In step S122, the application program (mailer)

36

started in step S121 is executed in a manner that corre-sponds to the user's operations.

For example, in response to the user's operations to prepare e-mail, the mailer carries out processes to draft e-mail data. If the user performs operations to send or receive e-mail, the mailer accesses the mail transmission server or mail reception server via the net-work to execute processes for e-mail transmission or re-ception.

It should be noted that the mailer program is exe-cuted in step S122 in the environment that was set up earlier in step S120 for network connection and for mail transmission and reception. That means e-mail transmis-sion or reception typically involves the use of the mail address specified in the set-up of the environment. Fur-thermore, it is the mail transmission server and mail re-ception server established in the environment set-up that are to be accessed for mail transmission and reception.

If the user performs operations to preserve the created e-mail as a draft, to send or to receive e-mail, or to delete transmitted or received e-mail, the mailer program is prompted to create and/or update application files of the drafted e-mail data or of the transmitted or received e-mail data.

37

While the mailer is active, the creation, updating, and other managing processes regarding the application files are carried out in the RAM 103.

A check is made in step S123 to determine whether the user has performed operations to terminate the mailer acting as the application program. If the result of the check in step S123 is affirmative, then step S124 is reached.

In step S124, the application file data in the RAM 103 of the personal computer is written to the RW area A6 on the loaded piece of the application media 2.

In that case, all application file data that has been retained in the RW area A6 so far is erased to make room for the application file data that will be written from the RAM 103. In this manner, every time the application program is terminated, the content of the RW area A6 is updated to reflect the application files that have been modified during the current pass of program execution. The process in step S124 is typically carried out by the application program in response to the user's operations to terminate the program execution. In other words, in response to the user's operations to terminate the mailer, the application program is prompted to issue an event whereby the application file data retained in

38

the RW area A6 is replaced with the application file data being held in the RAM 103.

Alternatively, the application files may be stored on the hard disk drive 108 of the personal computer for management purposes while the mailer is active. In this case, the application files held on the hard disk drive 108 are erased at the same time as they are written to the RW area A6 of the application media 2.

In step S125, the application program that has been active up to that point is terminated.

In the foregoing example, the operating system (OS) of the personal computer is assumed to control the steps outlined in Figs. 5 and 6 so that the personal computer will function in accordance with the application media 2 embodying the invention. The mailer as an application program may in the future be incorporated into the OS as one of its basic functions and/or may be designed to accept plug-in data or update data to comply with the application media 2 that may evolve over time. Additional OS program data constituting a function for dealing with the application media 2 or the plug-in data (update data) for providing the OS with a function to address the application media 2 may be recorded on various storage media that are distributed illustratively as package media.

39

If such data is held in a server, the data may be up-
loaded to terminals such as the personal computer over
the network.

In addition to the application files, the RW area
A6 may accommodate other data related to the application
program.

For example, many popular application programs in-
cluding the mailer are designed to let their tool bar or
their appearances be set up as desired by the user. The
setting information known as the user setting information
may then be recorded to the RW area A6. When the applica-
tion program is started in step S121 as discussed above,
the user setting data retrieved from the RW area A6 may
be used for establishing the environment for the applica-
tion program.

The user settings may well be changed frequently to
reflect the user's varying preferences. Where the user
setting data is arranged to be recorded in the rewritable
RW area A6, any changes to the user setting data may be
dealt with by simply updating the data in the RW area A6.

The application program to be stored on the appli-
cation media is not limited to the mailer. Alternatively,
any application program that connects to the network such
as a web browser may be held on the application media. As

another alternative, any other application program that does not make use of the network connection may be recorded on the application media.

The type of media on which the application program is recorded is not limited to the optical disk type. Alternatively, any other type of storage media such as a semiconductor memory device (more specifically, a flash memory) may be utilized. In the alternative case, the media ID needs to be recorded to the media in such a manner that the ID is nonrewritable and that a suitable memory drive is allowed to read the ID from the media. The memory area of the media may be divided into three portions: a ROM area, a write-once (R) area where data may be written only once and not rewritable, and an RW area where data may be written repeatedly. The application program and preset information may be recorded in the ROM area, the user setting information in the R area, and application files in the RW area.

As described above, this invention envisages a storage medium including at least a storage area that stores identification information and an application program and another storage area into which to store user-specific user-related information (i.e., user setting information) in write-once fashion. When loaded with the

41

inventive storage medium, the information processing apparatus has a suitable operating environment set up using environment setting information which is found on the loaded storage medium and which at least includes the user-related information. The operating environment thus set up is specific to each user because it is based at least on the user-related information. In the user-specific environment thus established, the application program held on the same storage medium can be started and executed.

 With the above structure in place, the user need only record once the user-related information to the storage medium. Thereafter, every time the application program held on the same storage medium is to be used, the operating environment specific to the user is automatically set up.

 In other words, there is no need for the user to repeat the tedious and complicated manual input of settings to each different personal computer to set up the necessary operating environment therein.

 The application program to be activated in the environment based on the environment setting information recorded on the storage medium is retained on the same medium. It follows that as long as the user is in posses-

42

sion of the inventive storage medium carrying the application program and as long as the system environment required (e.g., OS) is common, the user can utilize the application program in a user-specific operating environment on any information processing apparatus into which the storage medium may be loaded.

The environment is set up and the application program is executed only if the storage medium is successfully authenticated by use of the identification information stored in nonrewritable fashion on the same medium. The application program held on an illegitimate storage medium not furnished with the identification information will not be executed. These arrangements typically prevent the use of a storage medium prepared by illicitly copying the data from the storage medium according to the invention.